Foundations for *Inspiring Connections* Session 5

Welcome!

Foundations for Inspiring Connections - Session 5

What should I do before we get started?

- + Please unmute to respond to the door question - Pick One:
    a. high five,
    b. fist bump,
    c. handshake,
    d. other

- + Review our Virtual Routines.

Virtual Routines

- ● Join with microphone.
- ● Private chat facilitator for individual support.
- ● Share your ideas.

Welcome!

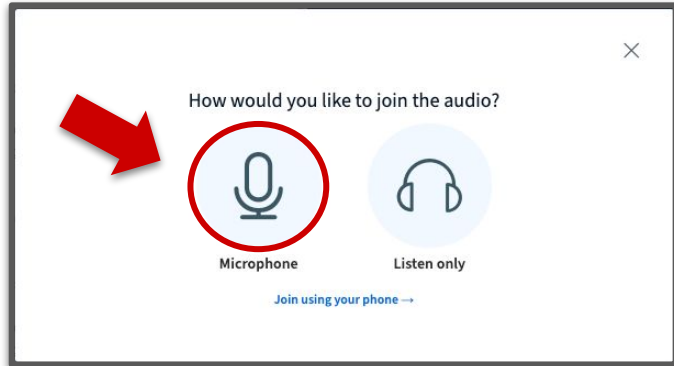CPM Virtual Learning Series

Tech Tip

Viewing Options

User list toggle

Fullscreen Application

Settings

About

Help

Keyboard shortcuts

Manage layout

Leave meeting

Layouts

Custom

Smart layout

Focus on presentation

Focus on video

Cancel   Confirm

Styles

Slide 1

100%

4

Tech Tip

Audio

Troubleshooting

Microphones

Default - Virtual Desktop Mic (Virtual)

External Microphone (Built-in)

Virtual Desktop Mic (Virtual)

ZoomAudioDevice (Virtual)

Speakers

Default - Virtual Desktop Mic (Virtual)

Headphones (Built-in)

Virtual Desktop Mic (Virtual)

ZoomAudioDevice (Virtual)

Leave audio

How would you like to join the audio?

Microphone

Listen only

Join using your phone →
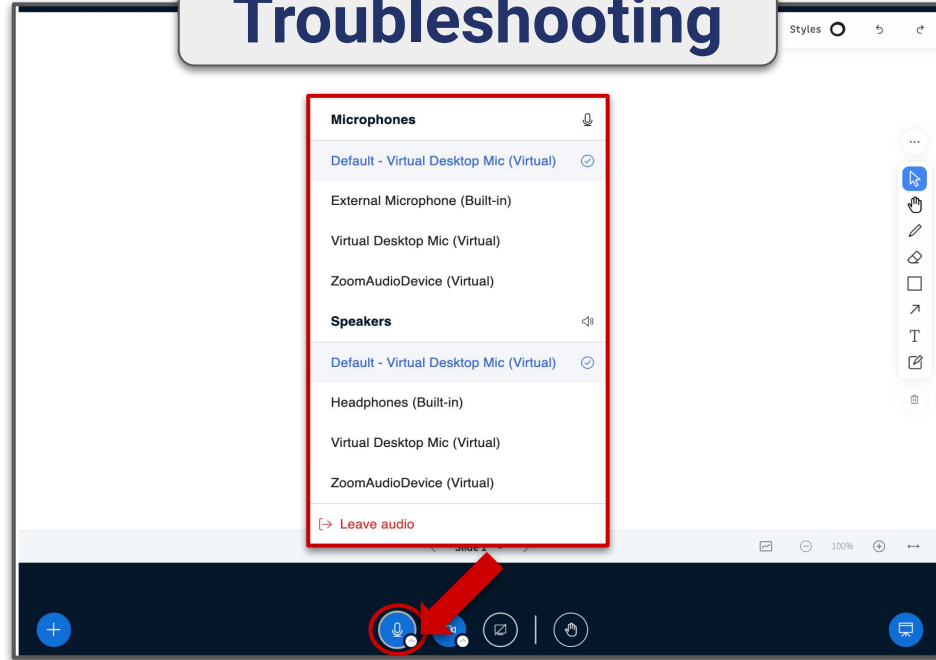
Opening
Foundations for Inspiring Connections Virtual Series

+ Sessions 1 & 2: Positive Classroom Culture
+ Sessions 3 & 4: Collaborative Learning
+ **Sessions 5 & 6: Problem-Based Learning**
+ Sessions 7 & 8: Mixed, Spaced Practice

+ Follow-Up Sessions 1 & 2: Supporting Productive Struggle
+ Follow-Up Sessions 3 & 4: Formative Assessment

Opening
Outcomes

Together we will:

become familiar with the CPM Problem-Based Learning research pillar.

learn how the design of *Inspiring Connections* supports and develops problem-based learning.

reflect on current practices and beliefs to develop a plan for the implementation of *Inspiring Connections*.
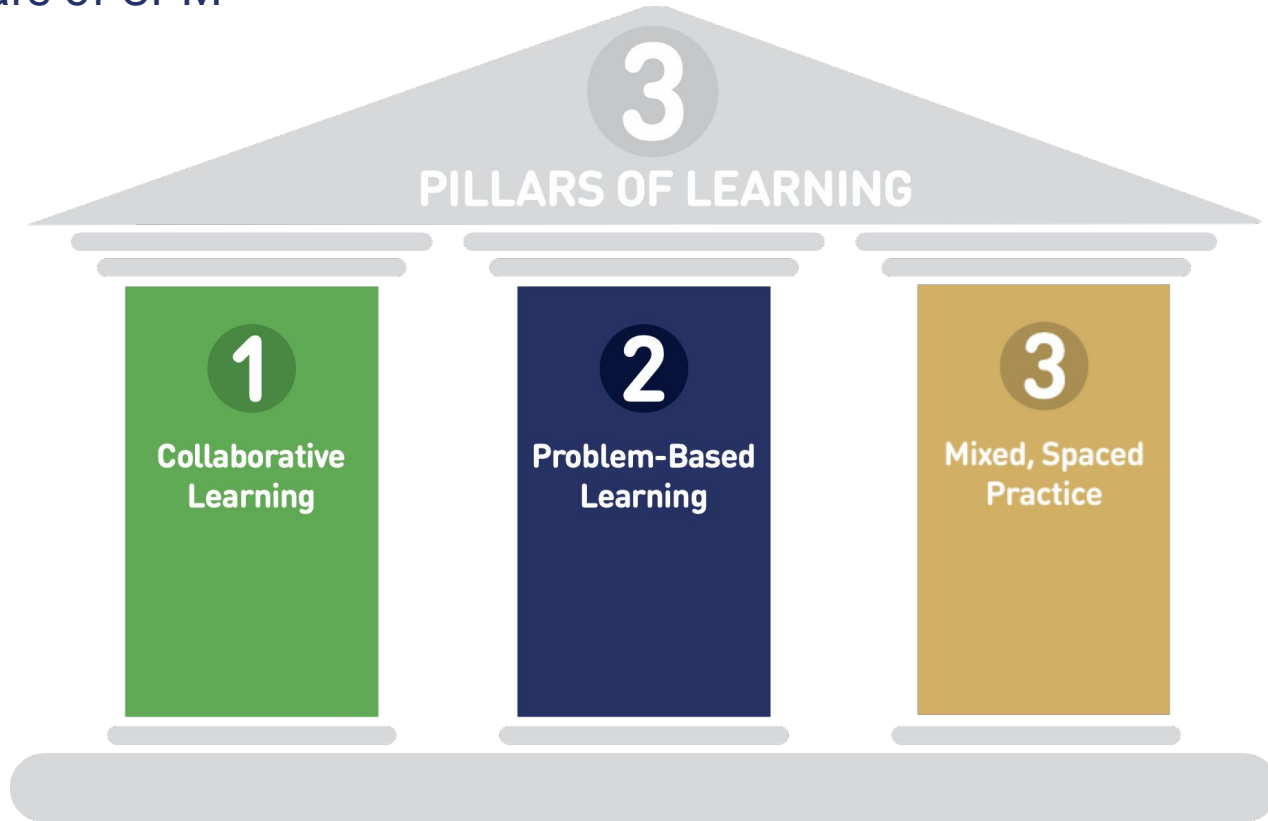
collaborate and learn with other teachers.

Opening
Session 5

Focus: Problem-Based Learning

+ Opening & Icebreaker
+ Research Connections
+ Problem-Based Learning
+ Venues
+ Lesson Sequence
+ Closure

Learning Target: I can get ready to learn.

Opening
Three Pillars of CPM

3
PILLARS OF LEARNING

1 Collaborative Learning

2 Problem-Based Learning

3 Mixed, Spaced Practice

Guiding Principles

CPM's Guiding Principles

Students deepen their mathematical understanding when they are engaged with concepts over time.

Students have significantly better retention of mathematics when concepts are grounded in context.

Students' involvement in effective study teams increases their ability to learn mathematics.

Effective study teams are guided, supported, and summarized by a reflective, knowledgeable teacher.

Assessing what students understand requires more than one method and more than one opportunity.

When students and stakeholders embrace a growth mindset, they understand that mastery takes time, effort, and support.

Opening
Working Agreements

+ Be willing to take **risks.**

+ Have a **visionary** mindset.

+ Stay **engaged.**

+ Explore and reflect on our **beliefs.**

+ Give **grace** to others and ourselves.

Change takes time, effort, and support!

Set your status to thumbs up if you are ready to begin.

Agenda
Session 5

Focus: Problem-Based Learning

+ **Opening & Icebreaker**
+ Research Connections
+ Problem-Based Learning
+ Venues
+ Lesson Sequence
+ Closure

Learning Target: I can use a task to develop a collaborative community.

Opening
Inclusivity

"As data increases and more decisions are being based on data, students must develop a deeper understanding of the methods and ethics associated with collecting, analyzing, visualizing, and communicating data… by building data science into the math curriculum and integrating more datasets relevant to students' lived experiences, we can transform this perception and inspire more interest in the subject as a whole."

Dykema, K. (2024). "The importance of data science." President's Message. NCTM.

Icebreaker: **Talk**-Write-Discuss

Is There a Relationship Between Income and Life Expectancy?

Sources: U.S. Center for Disease Control; U.S. Bureau of Economic Analysis

p.26
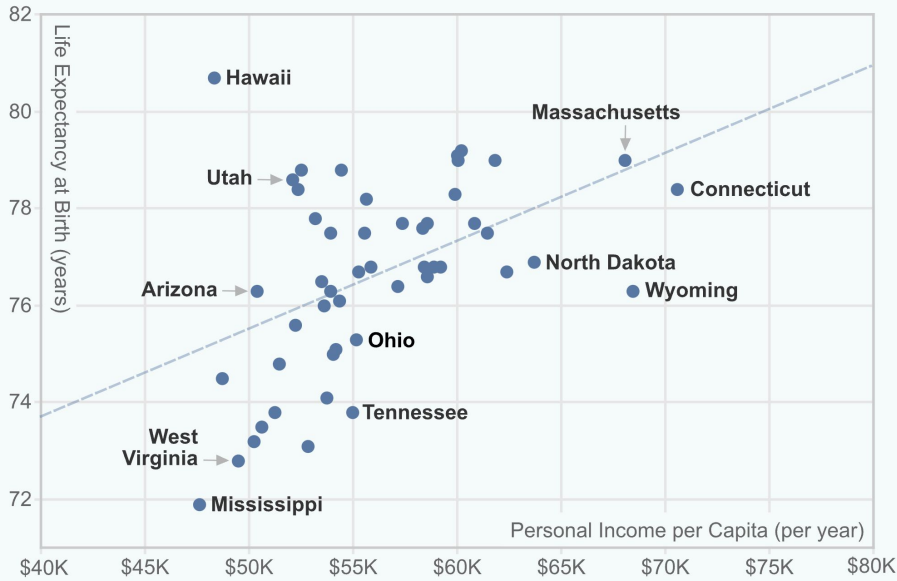
Team Whiteboard Space
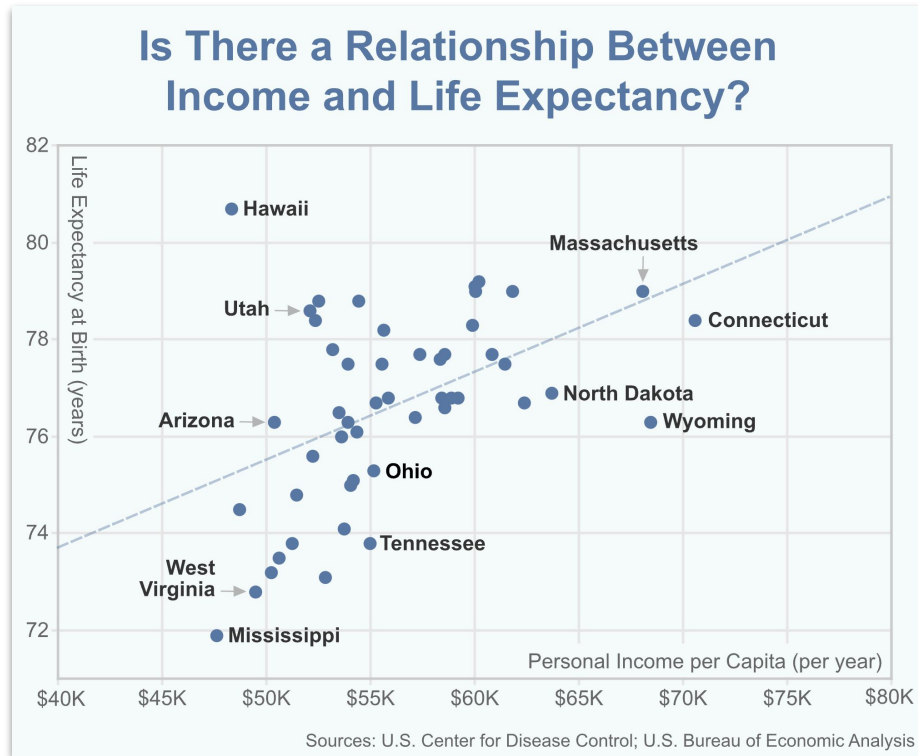*I notice _____, so I think _____.*

Representative

Investigator

Coordinator

Organizer

Icebreaker: Talk-**Write**-**Discuss**

Is There a Relationship Between Income and Life Expectancy?

Life Expectancy at Birth (years)

Personal Income per Capita (per year)

Sources: U.S. Center for Disease Control; U.S. Bureau of Economic Analysis

p.26

Icebreaker

Inclusivity

Teacher Tips – Lesson at a Glance

Teacher

Mathematical Language Routines

(Co-Crafted Questions)

Study Team & Teaching Strategies

(Talk-Write-Discuss, Dyad)

Discussion Supports

(Talk Moves)

Want to Learn More?

(Lesson at a Glance)

Agenda
Learning Target

Focus: Problem-Based Learning

+ Opening & Icebreaker

+ **Research Connections**

+ Problem-Based Learning

+ Venues

+ Lesson Sequence

+ Closure

Learning Targets: I can connect problem-based learning to culturally responsive pedagogy.

Research Connections
Reflection & Practice - Debrief

Share Around

Your Task:

+ Review your Session 4 Reflection & Practice

    + Each person shares — *What did you notice?*

    + Each person shares — *What did you wonder?*

+ Decide on one thing for your **Representative** to share out.

+ With remaining time, discuss ideas for Reflection & Practice.

p.24-25 *Add questions, comments, good ideas to share, and burning issues to the Parking Lot!*

Research Connections

From Dependent Learners to Independent Learners

The Dependent Learner	The Independent Learner
+ Is dependent on the teacher to carry most of the cognitive load of a task always + Is unsure of how to tackle a new task + Cannot complete a task without scaffolds. + Doesn't retain information well or "doesn't get it".	+ Relies on the teacher to carry some of the cognitive load temporarily + Utilizes strategies and processes for tackling a new task + Regularly attempts new tasks without scaffolds + Has cognitive strategies for getting unstuck + Has learned how to retrieve information from long-term memory

(Culturally Responsive Teaching & the Brain, Hammond, 2015)

Competency 5: Model high expectations for all students

+ *Culturally responsive educators adopt the view that **all students** are capable of academic success, a belief that research shows is critical to supporting student growth. These educators do not assume some students will inevitably underperform on the basis of their race, culture, or other group difference. They understand that students of color and other marginalized students are particularly vulnerable to negative stereotypes about their intelligence, academic ability, and behavior, which can hinder their academic performance.*

Want to know more? See "8 Competencies for Culturally Responsive Teaching" in Teacher Materials

Research Connections
Connections

Dyad

+ I will provide opportunities for students to become independent in pursuing problems by _____.

+ I used to think _____, but now I think _____.

Learning Target: I can provide opportunities for students to become independent in pursuing problems.

p.27

Agenda
Session 5

Focus: Problem-Based Learning

+ Opening & Icebreaker
+ Research Connections
+ **Problem-Based Learning**
+ Venues
+ Lesson Sequence
+ Closure

Learning Targets: I can explain how problem-based learning supports long term retention.

Problem-Based Learning
Attaining Long Term Knowledge

3
PILLARS OF LEARNING

1 Collaborative Learning

2 Problem-Based Learning

3 Mixed, Spaced Practice
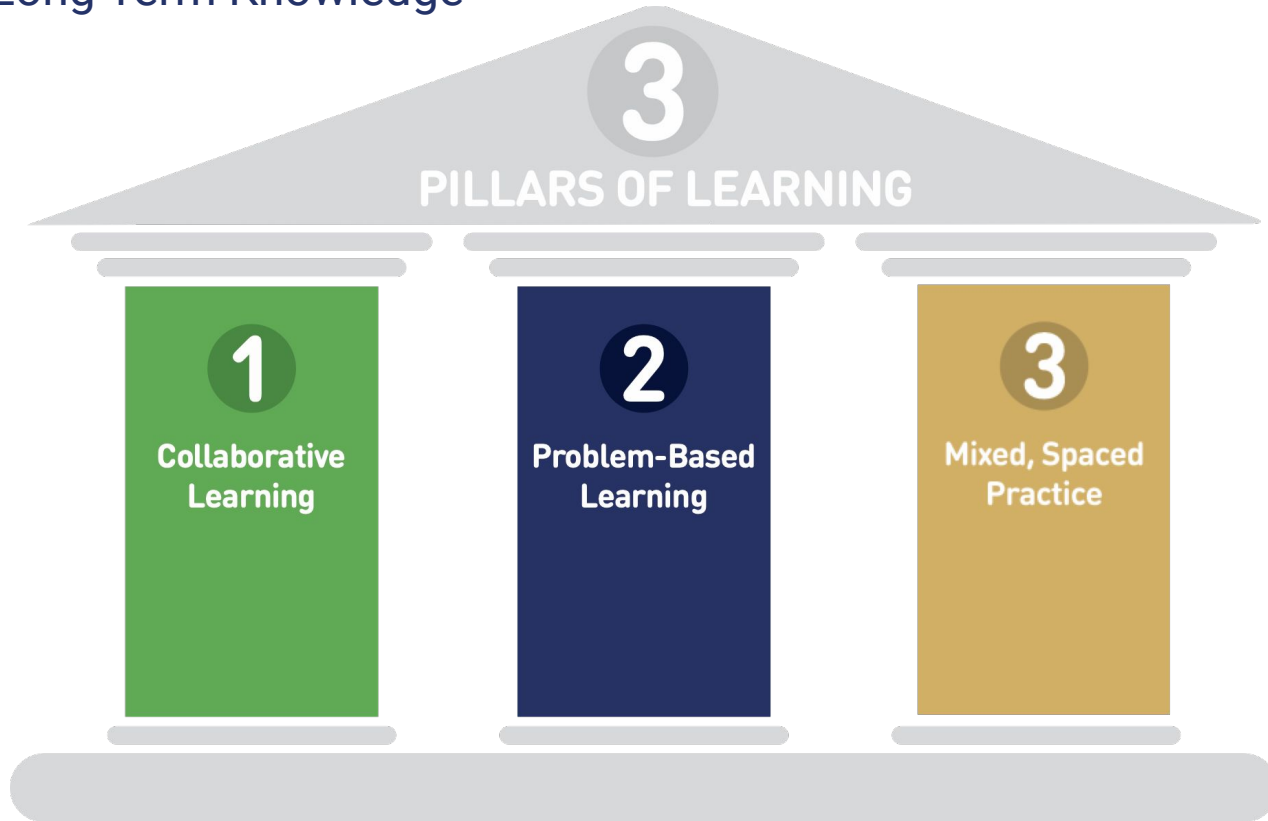
Problem-Based Learning

Research Reflection

Teacher

While reading the article think about:

What is math authority and

why is it important in problem-based learning?

p.27

Problem-Based Learning

Go-Around One Protocol - Debrief

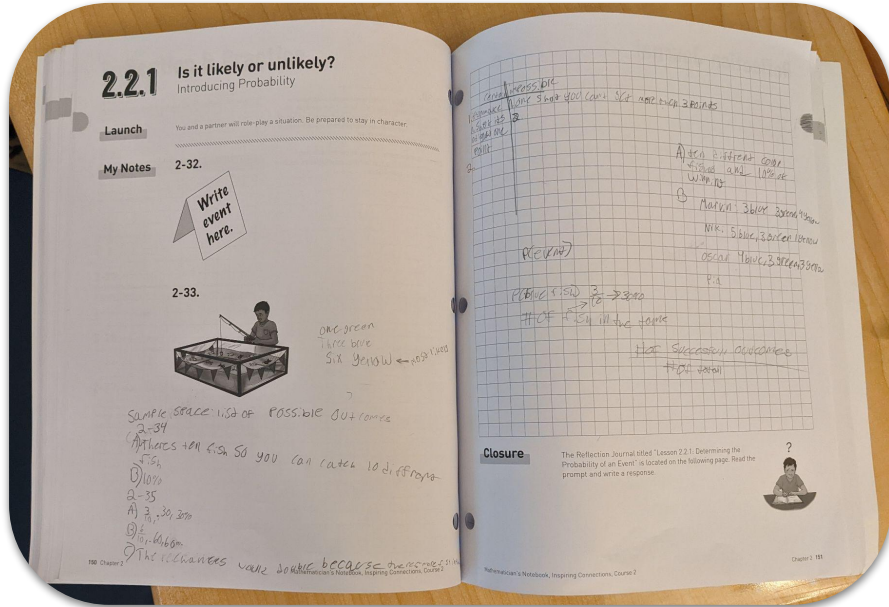## *What is math authority and why is it important in problem-based learning?*

Discussion Round

1. Person #1 reports their thought. Other team members listen. (No comments/questions.)

2. Repeat until everyone has shared.

3. As a team, comes to a consensus on an idea to share.

Team Consensus

Screen Break

Take a break and walk away from the computer.

Agenda

Session 5

Focus: Problem-Based Learning

+ Opening & Icebreaker
+ Research Connections
+ Problem-Based Learning
+ **Venues**
+ Lesson Sequence
+ Closure

Learning Target: I can explain how venues support problem-based learning.

Venues

Teacher Materials

**Digital Platform
Teams 1, 4, 7**

**Mathematician's
Notebook
Teams 2, 5, 8**

**Vertical
Non-Permanent
Surfaces (VNPS)
Teams 3, 6, 9**

Team Jigsaw

Digital Platform - Teacher Materials - Venues

+ Read the "Venues" Overview and your assigned venue.

+ What do you notice? What do you wonder?

+ How does _____ support problem-based learning?
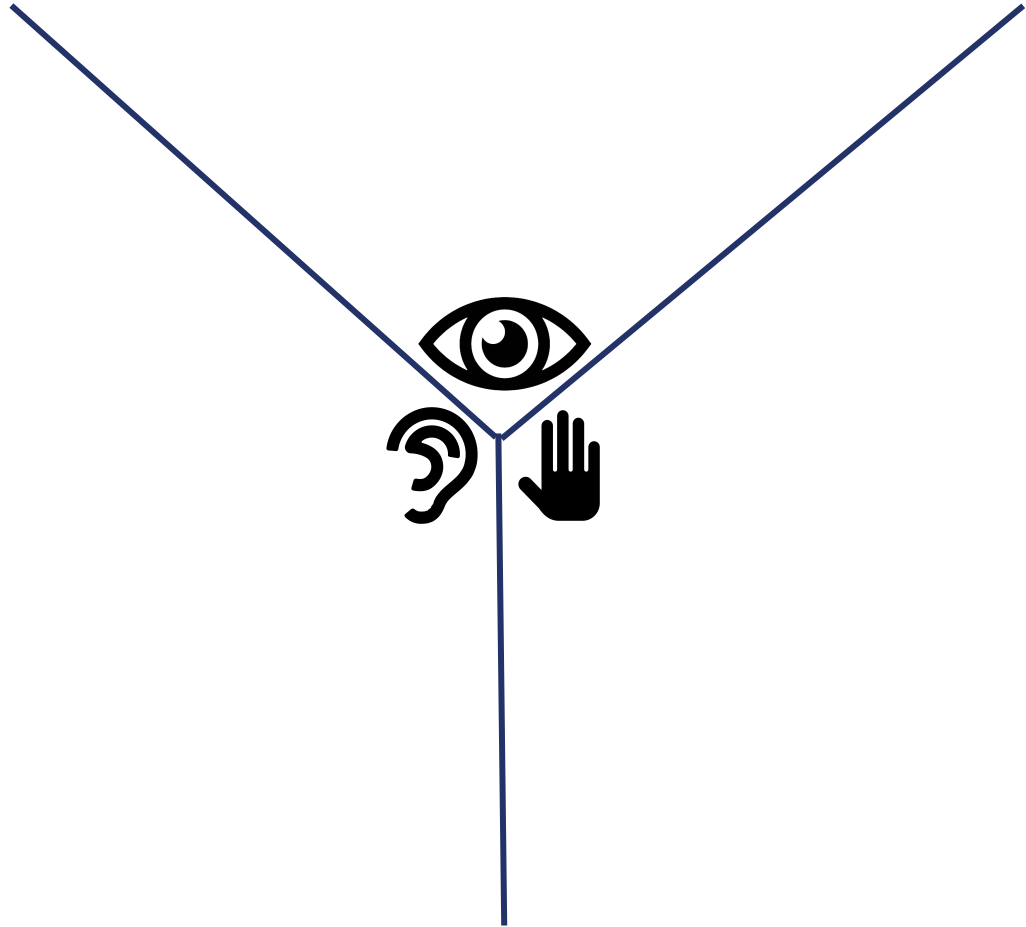
p.28

Venues

Team _____

When students are using

Digital Platform

Mathematician's Notebook

Vertical Non-Permanent Surfaces (VNPS)

what should it look like, sound like and feel like?

Agenda
Session 5

Focus: Problem-Based Learning

+ Opening & Icebreaker
+ Research Connections
+ Problem-Based Learning
+ Venues
+ **Lesson Sequence**
+ Closure

Learning Target: I can explain how the lesson sequence supports problem-based learning..

Lesson Sequence
Supporting Problem-Based Learning

45 min [
Door Question - Relationship-building
Launch (~5 min) - Lesson Opening
Explore (~30 min) - Problem-Based Learning
Closure (~8 min) - Summary, Reflection and/or Feedback
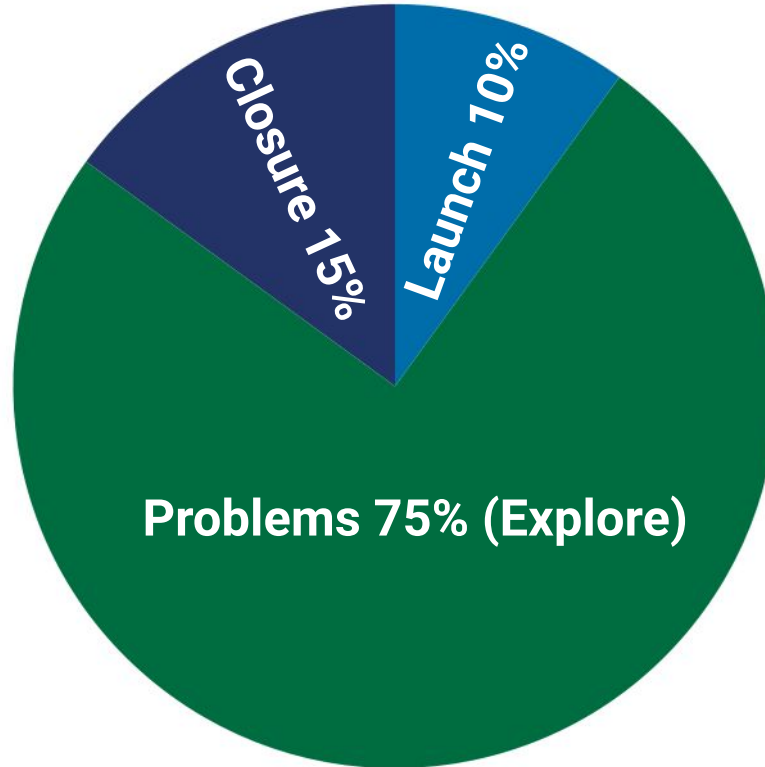**Reflection & Practice** - Check Your Understanding

p.29

Classroom Clock

p.29

Lesson Sequence

Classroom Clock

Closure 15%

Launch 10%

Problems 75% (Explore)

p.29

Lesson Sequence
Authors' Vision

Teacher

Plan **Teach**

< | Lesson 1.2.1 | >   **Toolbox** ∨

1-58.

👆 Reminders

When you use the same number of cold cubes as hot cubes in Marcellus's drink, the temperature is just right. He calls this temperature $0°M$ for 0 difference from what he wants. The trouble is that he always wants to have some cubes in his drink.

a. What are some combinations of hot and cold cubes that would make the temperature 0 (or $0°M$)? How do you know?

Answer ∨

Start a Class ∨

Lesson Overview ∧

Launch

Explore ∧

Keep Cool

1-57.

a.

b.

c.

34

Lesson Sequence

Reflect: Lesson & Authors' Vision

Teacher

Your Task:

+ As you read the lesson,
   → click "Reminders"
   → review the "Authors' Vision".

+ *How does the **lesson sequence** support problem-based learning?*

Lesson Sequence
Door Question
Launch
Explore
Closure
Reflection & Practice

p.29

Lesson Sequence

Reflect & Connect

Focus Question:
How does the lesson sequence support problem-based learning?

Door Question

Launch

Explore

Closure

Reflection & Practice

p.29

Agenda
Session 5

Focus: Problem-Based Learning

+ Opening & Icebreaker
+ Research Connections
+ Problem-Based Learning
+ Venues
+ Lesson Sequence
+ **Closure**

Learning Target: I can reflect on the impact of problem-based learning.

Closure

Outcomes

We have had the opportunity to:

become familiar with the CPM Problem-Based Learning research pillar.

learn how the design of *Inspiring Connections* supports and develops problem-based learning.

reflect on current practices and beliefs to develop a plan for the implementation of *Inspiring Connections*.

collaborate and learn with other teachers.

Closure

Study Team and Teaching Strategies & Math Language Routines
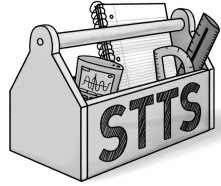
Ambassador	Go Chat	Pass It On	Stop and Scan	Stronger & Clearer
Board Report	Huddle	Pick Three	Swapmeet	Collect & Display
Carousel	Jigsaw	Quick Pitch	Talk-Write Discuss	Critique, Correct, Clarify
Dyad	Learning Ladder	Reciprocal Teaching	Teammates Consult	Information Gap
Exhibit Visit	Listening Post	Red Light, Green Light	Team Spotlight	Co-Craft Questions
Fishbowl	Numbered Heads	Relay	Think-Ink-Pair-Share	Three Reads
Give One, Get One	Pairs Check	Share Around	Visibly Random Teams	Compare & Connect
Glow and Grow	Partner	Silent Debate		Discussion Supports

Closure
Three Research Pillars

SECTION ONE: The pillars that represent necessary first steps in any implementation.

Collaborative Learning	Problem-Based Learning	Mixed, Spaced Practice
Students and teachers are aware of the purpose for and value of working in teams, and are familiar with team norms and roles.	Students and teachers share math authority as they value and engage in productive struggle. Teachers guide without taking over the thinking.	Both individual lessons and chapters are followed, using suggested pacing. Reflection and Practice problems are assigned and valued as an essential part of learning.

Teacher Tips

Teacher Actions That Support Implementation

Use the Authors' Vision as intended.	Work all the problems in the lesson ahead of time, including the Reflection & Practice problems.	Create purposeful lesson plans.

Closure
Management Tips & Ideas

Closure

+ **Parking Lot**

+ **Attendance & Feedback**
    Enter passcode in the portal: **######**

+ **Next Steps:**
    ○ Complete yesterday's Reflection & Practice problems if you have not already (p.24 & 25 in the Participant Notebook).

    ○ Explore the (yellow) "Before You Start Inspiring Connections" module.

@CPMeducationalprogram   @CPMmath   @CPMmath